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OCT 19 2006

REMARKS

Claims 10, 11, 22, and 26-28 are currently pending in the subject application, and are presently under consideration. Claims 10, 11, and 22 are allowable. Claims 26-28 are rejected. Favorable reconsideration of the application is requested in view of the comments herein.

I. **Rejection of Claims 26-28 Under 35 U.S.C. §103(a)**

Claims 26-28 stand rejected under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,275,518 to Takahashi et al. ("Takahashi") in view of US Patent No. 5,689,805 to Ayerst et al. ("Ayerst").

Claim 26 recites a system for generating a variable hop cycle beam laydown comprising first cells supported by a first beam hop cycle associated with a first downlink beam, second cells supported by a second beam hop cycle associated with a second downlink beam, the second beam hop cycle being different than the first beam hop cycle, and transition cells supported by a transition beam hop cycle. In the Response to the Office Action dated March 20, 2006 (hereinafter "Response to the Previous Office Action"), Representative for Applicant argued that Takahashi fails to teach a beam hopping system. As described in the Response to the Previous Office Action, Takahashi discloses a frequency hopping communication system, such that a plurality of predetermined radio frequencies are hopped at regular time intervals, the hopping pattern defining an order of radio frequencies on a given cell (see, *e.g.*, Takahashi, col. 3, ll. 50-57). Representative for Applicant respectfully submits that frequency hopping, as taught by Takahashi, is an entirely different communication concept from beam hopping, as recited in claim 26.

In the Office Action dated August 30, 2006 (hereinafter, "Present Office Action"), the Examiner does not address this argument as set forth in the Response to the Previous Office Action (see, *e.g.*, Present Office Action, pages 2-4). Instead, the Examiner maintains the rejection of claim 26 and states that Takahashi teaches a first *beam* hop cycle, a second *beam* hop cycle, and a transition *beam* hop cycle (Present Office Action, pages 5 and 6; emphasis added). In addition, the Examiner specifically states that "Takahashi teaches *frequency hopping in*

different cells' and '*a plurality of predetermined radio frequencies are hoped* [sic] *at regular time intervals*'," (Present Office Action, page 6, citing Takahashi, col. 3, ll. 50-64). The Examiner thus acknowledges the teaching of a frequency hopping scheme in Takahashi, but fails to recognize the fundamental difference between frequency hopping and beam hopping in communication systems.

In addition, Representative for Applicant respectfully submits that the Examiner's emphasis on "cells" in the rejection of claim 26 to demonstrate a teaching of a beam hop cycle of first cells, second cells, and transition cells is misplaced. The frequency hopping scheme taught by Takahashi is such that frequencies are hopped within an individual cell for communications between a base station and radio stations in a ground-based radio LAN (see Takahashi, *e.g.*, FIG. 1). Multiple cells is fundamental for frequency hopping, as each adjacent cell hops frequencies so as to avoid interference with each other caused by transmitting the same frequency (see Takahashi, *e.g.*, col. 4, ll. 41-67). Also, frequency hopping, as described above, is specific to a given cell. However, as recited in claim 26, the first beam hop cycle, the second beam hop cycle, and the transition hop cycle each support a plurality of cells (*i.e.*, the first cells, the second cells, and the transition cells, respectively), and not just one cell. Even assuming *arguendo* that such an element can be considered as taught by Takahashi, the Examiner asserts that Takahashi teaches transition cells supported by a transition hop cycle without providing any support in the teachings of Takahashi for such an assertion as to distinguish transition cells from the first cells and the second cells, as distinguishable in claim 26. Furthermore, as described above, the frequency hopping scheme of Takahashi is directed to communications between a base station and radio stations in a cell. Such communications, however, cannot be considered a "beam" hop cycle, as a "beam" inherently refers to a directed communications, whereas the communications between the base station and the radio stations in Takahashi is omnidirectional (see Takahashi, *e.g.*, FIGS. 1, 3, and 14).

For all of these reasons, Representative for Applicant maintains the argument that Takahashi fails to teach or suggest first cells supported by a first beam hop cycle associated with a first downlink beam, second cells supported by a second beam hop cycle associated with a

second downlink beam, the second downlink beam being different than the first beam hop cycle, and transition cells supported by a transition beam hop cycle, as recited in claim 26.

Claim 26 also recites that the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell during a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell during a second percent of the time period and a power gated downlink beam transmitted to the first transition cell and the second transition cell for the remaining percent of the time period. The Examiner concedes that Takahashi does not teach or suggest this element of claim 26 (Present Office Action, page 6). The Present Office Action maintains that this element of claim 26 is taught by Ayerst (see, *e.g.*, Present Office Action, pages 2-4 and 6-8) by stating that Ayerst teaches a "transition cell" of cells by stating that, in FIG. 1 of Ayerst, "cell 2A is a 'transition cell' of cells 1A and 3A, or cell 2C is a 'transition cell' of cells 1C and 3C," (Present Office Action, page 3 and 7; citing Ayerst, col. 2, line 45 through col. 3, line 12; col. 4, line 42 through col. 5, line 11). Representative for Applicant respectfully disagrees.

Representative for Applicant respectfully maintains the argument that Ayerst does not teach or suggest a transition cell, as it is recited in claim 26. Ayerst teaches that each of a plurality of cells has one cell transmitter (*e.g.*, base station) that defines a geographical transmission area that includes one or more receivers (see, *e.g.*, Ayerst, Abstract; col. 4, ll. 46-53). Ayerst teaches a simulcast system wherein each of a plurality of cells' base stations transmit to the respective receivers in their given cell simultaneously (see, *e.g.*, Ayerst, col. 4, line 58 through col. 5, line 11). Specifically, a communication protocol (FIG. 1, 120) includes a number of data frames, each being simultaneously transmitted to a plurality of cells (1A, 1C, etc.), with each cell having its own base station that transmits these frames in only that cell's geographically limited area (Ayerst, col. 5, ll. 11-22). Thus, the Examiner appears to equate a given cell that is receiving a transmission during a given data frame as a transition cell. Representative for Applicant respectfully disagrees with such an interpretation of a transition cell, as it is defined in claim 26.

Assuming *arguendo* that the communication protocol taught by Ayerst can be considered a beam hop cycle, Ayerst teaches only one beam hop cycle, and thus does not teach or suggest a transition cell that is supported by a transition beam hop cycle, as recited in claim 26. In the Response to the Previous Office Action, Representative for Applicant set forth this argument by stating that Ayerst does not teach or suggest a transition cell supported by a transition beam hop cycle, the transition beam hop cycle comprising transition downlink beam energy in a first transition cell a first percent of a time period, the transition downlink beam energy in a second transition cell a second percent of the time period, and a power gated downlink beam for the remaining percent of the time period, as recited in claim 26. In the Present Office Action, the Examiner does not address this argument other than to state that "applicant's claims merely recite *'first percent of a time period, a second percent of the time period and a remaining percent of the time period'*, but fail to further disclose how many percent," (Present Office Action, page 3).

Representative for Applicant respectfully submits that the amount of percent of time is immaterial to the patentability of claim 26, as Ayerst does not teach beam energy that is transmitted to more than one cell. As described above, Ayerst teaches that a plurality of transmission cells include one or more receivers and a transmitter which define geographical transmission areas that communicate using a communication protocol (Ayerst, Abstract; col. 4, ll. 42-43). Ayerst also teaches that the communication protocol includes a control frame which is simulcast transmitted *from all cell transmitters within the communication system*, and which is followed by a plurality of message transmission frames which are transmitted as non-simulcast transmissions in a predetermined sequence *from each of the cell transmitters* (Ayerst, Abstract; col. 5, ll. 16-22; emphasis added). Claim 26 is distinguishable in that the downlink beam energy of the transition beam hop cycle is the same downlink beam energy for both the first transition cell for the first percent of the time period and the second transition cell for the second percent of the time period. Specifically, claim 26 clarifies that the downlink beam energy is from a common source. As described above, the hopping scheme of Ayerst is directed to transmissions from each of a plurality of cell transmitters occupying each of a plurality of cells. Ayerst does not teach or suggest time sharing of a given source of downlink beam energy between at least

two distinctly different geographically located cells at different percentages of time. Therefore, Ayerst does not teach or suggest that the transition beam hop cycle comprises transition downlink beam energy transmitted to a first transition cell a first percent of a time period, the transition downlink beam energy transmitted to a second transition cell a second percent of the time period and a power gated downlink beam transmitted to the first transition cell and the second transition cell for the remaining percent of the time period, as recited in claim 26.

Also regarding the interpretation set forth by the Examiner that "cell 2A is a 'transition cell' of cells 1A and 3A, or cell 2C is a 'transition cell' of cells 1C and 3C," Representative for Applicant respectfully submits that such an interpretation violates the doctrine of claim differentiation. By asserting that "cell 2A is a 'transition cell' of cells 1A and 3A," the Examiner appears to make no distinction in the teachings of Ayerst between a first cell, a second cell, and a transition cell. Specifically, based on the Examiner's assertion, cell 3A would be considered a transition cell of cells 2A and 4A, cell 4A would be considered a transition cell of cells 3A and 5A, etc. Thus, all of the "A" cells in Ayerst are asserted by the Examiner to be both first cells and transition cells, thus providing no distinction in the language of claim 26 between the first cells and the transition cells, regardless of the respective hopping schemes. However, the Federal Circuit has held that the doctrine of claim differentiation dictates that where claims use different terms, those differences are presumed to reflect a difference in the scope of the claims. *Forest Laboratories, Inc. v. Abbott Laboratories*, 239 F.3d 1305, 1310, 57 USPQ2d 1794 (Fed. Cir. 2001). Therefore, Representative for Applicant respectfully submits that the Examiner provides no distinction between first cells, second cells, and transition cells, where such a distinction is proper.

In addition, claim 26 recites that the first downlink beam is provided to one of the first cells that is adjacent to the first transition cell during one of the second percent of the time period and the remaining percent of the time period, and such that the second downlink beam is provided to one of the second cells that is adjacent to the second transition cell during one of the first percent of the time period and the remaining percent of the time period. This element of claim 26, coupled with the above recitation of the transition beam hop cycle and the second

beam hop cycle being different from the first beam hop cycle, is distinguishable from the teachings of Ayerst, individually or in combination with Takahashi. As the second beam hop cycle is different from the first, transition cells receive the power gated downlink beam to compensate for overlaps in transmission times between adjacent first or second cells to avoid interference, thus allowing variable beam hopping schemes (see, *e.g.*, Present Application, page 20, line 10, through page 24, line 12). The system of Ayerst is directed to a consistent hopping scheme between each of the groups of cells (*e.g.*, cell groups A, B, and C). As such, the system of Ayerst avoids adjacent cell interference based on the consistent hopping scheme. Thus, the system of Ayerst does not necessitate the use of power gated downlink beams in transition cells to avoid interference with adjacent cells, as the hopping scheme taught by Ayerst is the same for each group of cells. In contrast, claim 26 is directed to a system that allows different beam hop cycles between groups of cells, such as based on a dynamic allocation of bandwidth between groups of cells, by providing the power gated downlink beam to the transition cells adjacent to the different groups of cells seeks to avoid interference. For these reasons, Representative for Applicant respectfully submits that Ayerst teaches away from claim 26. Furthermore, the Examiner provides no support for a teaching of a power gated downlink beam in the system of Ayerst in the rejection of claim 26, when a power gated downlink beam has a clear technical meaning as provided in the Specification of the Present Application (see Present Application, e.g., page 13, ll. 8-16; page 14, ll. 17-19; page 25, ll. 4-8).

Representative for Applicant also respectfully maintains the argument that there is no motivation for one of ordinary skill in the art to combine the teachings of Takahashi with the teachings of Ayerst to achieve the combination recited in claim 26. As described above, the teachings of Takahashi are directed to a frequency hopping scheme, which is inapplicable to the variable beam hopping scheme that is recited in claim 26. On the other hand, Ayerst teaches a hopping scheme that is based on transmissions from base stations to respective cells that are defined by the geographical transmission area. Thus, the hopping scheme of Ayerst is not applicable to frequency hopped communications, as is taught by Takahashi. Takahashi and Ayerst thus teach communication concepts that are fundamentally unrelated. The Present Office

Action provides a motivation for combination that states a "motivation...found in the references themselves in order to provide a method for providing minimum transmission delay for delivery of a message in a communication system which comprises a plurality of transmission cells," (Present Office Action, page 4; citing Ayerst, col. 2, ll. 14-17). Representative for Applicant respectfully submits that claim 26 is unrelated to the motivation for one of ordinary skill in the art to combine the teachings of Takahashi and Ayerst provided by the Examiner in the Present Office Action.

The Background of the Present Application recites the following:

> Spot beams are distinguished from one another by such characteristics as frequency or polarization. These characteristics allowed the spot beams in an appropriately designed laydown to operate without substantial cross channel, co-channel, or cross polarization interference. Each spot beam typically provides a fixed amount of bandwidth. Thus, prior laydowns often operated under the constraint that each cell had the same bandwidth allotment as any other cell. To provide additional bandwidth to a cell therefore meant providing additional spot beams for the cell, a potentially costly and complex proposition.
>
> On the other hand, a laydown may include cells that simply do not need the bandwidth provide by an entire spot beam. However, prior satellites were incapable of reallocating spot beams to meet bandwidth demand, particularly on a dynamic basis. Thus, a risk exists that, after launch, an increase in bandwidth demand cannot be met, and that a decrease in bandwidth demand will result in wasted power.
>
> A need has long existed in the industry for a beam laydown that addresses the problems noted above and others previously experienced. (Present Application, page 2, line 11 through page 3, line 11).

As provided in this passage, the claims of the Present Application are unrelated to providing minimum transmission delay for delivery of a message in a communication system which comprises a plurality of transmission cells, as asserted by the Examiner in the Present Office Action. Instead, the claims of the Present Application, including claims 26-28, are directed to dynamic allocation and reallocation of bandwidth that minimizes cross channel, co-channel, and cross polarization interference. Therefore, the asserted motivation to combine the

teachings of Takahashi and Ayerst of providing minimum transmission delay for delivery of a message in a communication system which comprises a plurality of transmission cells does not address the nature of the problem to be solved.

The Federal Circuit has decided that "[t]here are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). Neither Takahashi nor Ayerst provides a motivation for dynamic allocation and reallocation of bandwidth that minimizes cross channel, co-channel, and cross polarization interference, and thus the teachings of the prior art are insufficient to provide the motivation to combine the teachings of Takahashi and Ayerst to achieve claim 26. In addition, as described above, Takahashi and Ayerst thus teach communication concepts that are fundamentally unrelated, and thus the knowledge of persons of ordinary skill in the art is not sufficient to achieve a motivation to combine the teachings of Takahashi and Ayerst to achieve claim 26. As described above, the asserted motivation to combine the references does not address the nature of the problem to be solved, which is to prevent interference in adjacent cells in a system that dynamically allocates and reallocates bandwidth.

Even assuming a person of ordinary skill in the art sought to address the nature of the problem, the dynamic allocation and reallocation of bandwidth that minimizes cross channel, co-channel, and cross polarization interference, the person of ordinary skill in the art would not look to the teachings of Takahashi or Ayerst, individually or in combination. Takahashi teaches a frequency hopping scheme to prevent adjacent cell interference, which does not address dynamic allocation and reallocation of bandwidth between adjacent cells. Ayerst, as described above, provides a consistent hopping scheme between groups of cells, which likewise does not address dynamic allocation and reallocation of bandwidth between adjacent cells, as a consistent hopping scheme is what the claims of the Present Application, including claim 26, seek to avoid. Thus, neither Takahashi nor Ayerst, together or individually, provide a solution to the dynamic allocation and reallocation of bandwidth that minimizes cross channel, co-channel, and cross polarization interference. Therefore, for all of these reasons, Representative for Applicant

respectfully submits that it would not be obvious to one of ordinary skill in the art to combine the teachings of Takahashi with the teachings of Ayerst to achieve the invention of claim 26.

For all of the reasons described above, neither Takahashi nor Ayerst, individually or in combination, teach or suggest claim 26. Accordingly, withdrawal of the rejection of claim 26 is respectfully requested.

For the reasons described above regarding claim 26, claim 27 should likewise be patentable in view of Takahashi and Ayerst. In addition, claim 27 also recites a power gating circuit coupled to the waveform generator for gating power in the transition downlink beam. Representative for Applicant respectfully submits that neither the Office Action dated March 20, 2006, nor the Present Office Action, addresses this element of claim 27, and further respectfully submits that neither Takahashi nor Ayerst, individually or in combination, teach or suggest this element of claim 27. Therefore, for all of the reasons described above regarding claim 27, neither Takahashi nor Ayerst, individually or in combination, teach or suggest claim 27. Withdrawal of the rejection of claim 27 is respectfully requested.

For the reasons described above regarding claim 26, claim 28 should likewise be patentable in view of Takahashi and Ayerst. Therefore, for all of the reasons described above regarding claim 28, neither Takahashi nor Ayerst, individually or in combination, teach or suggest claim 28. Withdrawal of the rejection of claim 28 is respectfully requested.

Docket No. NG(ST)8104

Serial No. 09/599,036

CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,

Date 10-19-06

Christopher P. Harris
Registration No. 43,660

CUSTOMER NO.: 26,294

TAROLLI, SUNDHEIM, COVELL, & TUMMINO L.L.P.
1300 EAST NINTH STREET, SUITE 1700
CLEVELAND, OHIO 44114
Phone: (216) 621-2234
Fax: (216) 621-4072